

SUBNORMAL ACCOMMODATION AND PREMATURE PRESBYOPIA.

BY

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At least 99 % of "migraine" is caused by eyestrain, and smaller percentages of other types of headache, dyspepsia, malnutrition, etc. Many nervous and psychic disorders have the same origin, and the majority of cases of "idiopathic" lateral spinal curvature. When due to eyestrain, the failure to cure these troubles by ocular treatment is either due to the failure in preventing them by the same treatment, to the fact that the individual case is not chargeable to eyestrain, or to the oculist's fault. We are constantly and rapidly learning that our faults as refractionists explain our failures to cure. There is a vast realm of unsolved puzzles and mysteries in ophthalmic practice, but every advance we make shows that it was to our ignorance or carelessness that we should ascribe most of our failures. It is astonishing to perceive upon what slight and seemingly negligible things success depends. A whole art and science of therapeutics is being built up upon these nothings, heretofore, and even now, generally neglected by the great body of oculists and physicians of the world. That, of course, is the history of discovery and progress in every branch of knowledge. We pass at our peril the tiny thing, the trivial consideration, fact, or suggestion, upon which all great things depend.

A good, round three-fourths of our failures as oculists are due to our poor refraction work. In all Continental Europe it is simply a disgraceful farce, with the possible exception of that of one or two men. In England two or three men are doing work equal to that of a hundred in America. But it is simply amazing to find men in our own country who are "leading oculists" in their communities, and members of great ophthalmologic societies, utterly ignoring the conditions of accurate ametropia measurement, spurning cycloplegiacs, disdaining astigmatism and anisometropia, and, of course, heaping ridicule upon the "hobby-rider."

Of the remaining fourth of our failures to cure eye-

strain diseases, a large proportion is due to neglect of head-tilting, with the result that we do not locate accurately the slight unsymmetric axes of astigmatism. The ordinary and common symptoms, such as headache, gastric, nutritional, and nervous disorders, are consequently not relieved, and one of the great causes of spinal curvature is not discovered or prevented.

Many of our puzzling nonsuccesses are due to failure to recognize insufficient or paretic accommodation, or premature presbyopia. The books do not know of it, and the lecturers do not speak of it. Such cases are peculiarly tormenting, because the symptoms are plainly those caused by eyestrain, which the perplexed and desperate oculist cannot lessen. There is no test by which the fact may be learned, because for the time required in the ordinary tests there is almost always the ability to hold the vision perfect, or seemingly so, by an effort which exhausts with long-continued reading, writing, and sewing. Then the cases are so rare that the hundred normal accommodations following the last example of the abnormality make the oculist careless and likely to forget. Failure and ill-success is the penalty of routine. Moreover, the paresis of accommodation may occur in the most unlikely people, and as it is so peculiar, masked, and variable, it requires great alertness and conscientiousness to keep the danger in mind. But when subnormal accommodation in the young does exist, it means so much to the patient, and to the oculist also, to become aware of it! The relief by glasses is usually great, instantaneous, almost magical. Most of the 27 patients whose clinical histories are here epitomized had been treated by many other oculists, and all had failed to find the source of the evil. This makes me feel that, like myself, most of my colleagues have not recognized this pathogenic factor in a certain number of their patients. Some of these case histories date back from 6 to 14 years, but the fact of accommodational paresis has become clear to me only during the last few years. I have no doubt that I have missed recognizing it many times even during this time.

This is because we have neglected to notice that the function of accommodation is the only important one of the male human being that gives out in middle and advanced life, a fact that demonstrates biologically the recency and difficulty of its acquirement, the temporariness of its easy action, and consequently the variableness of its quality or power in heredity and exercise. The lens

is its organ, and all depends upon the endowment and preservation of its inherent elasticity or refracting power. The ciliary muscle does not lose its power, and hence the strain of effort of this muscle acting upon a paretic or subnormally elastic lens makes all the greater the reflexes of eyestrain. Without nervous connection with the brain and body, nourished only by blood-serum without blood-corpuscles, it is not surprising that the lens loses its elasticity, and thus gives the refractionist added and difficult problems. But with their solution the explanation is guaranteed of many of our most distressing failures to cure, and the opprobrium of our inability to relieve many diseases and cases is removed. The critics and ignorers of "the eyestrain hobby-rider," as they care more for the preservation of their prejudices than they do for the relief of the sufferings of their patients, will not at once welcome this new power in therapeutics. This, of course, will not long postpone the recognition of the fact.

CASE 476 offers an interesting example of the ever-varying conditions of accommodation anomalies. A man at the present time 46 years old has a static error of:

$$\begin{aligned} \text{R.} - \text{Sph. } 0.25 + \text{Cyl. } 1.00 \text{ ax. } 115^\circ &= 20/20 \\ \text{L.} + \text{Cyl. } 1.00 \text{ ax. } 75^\circ &= 20/20 \end{aligned}$$

But for distance he has an accommodation so strong that $- \text{Sph. } 1.00$ is required to give him normal distant acuteness. Even $- \text{Sph. } 0.50$ added to his static correction will give him only about 20/40 vision, and this is annoying. But he also presents the contradiction of insufficient accommodation for near, and $+ \text{Sph. } 1.75$ must be added to his distance glasses, in bifocals, to enable him to read without intense pain in the neck, a sore and swollen spot on the occipital bone, insomnia, etc. I have tried for years to reduce the accommodation power for distance, but without great success.

CASE 626 is that of a young woman who came to me soon after I entered upon practice, and who long had more faith in me than I had understanding of her disease. She had almost every symptom which has been charged to eyestrain and hysteria, but I preserve a clear conviction that few or none of her troubles were imaginary, and that if I had known what I discovered years later, I might have lessened her sufferings, if not cured them entirely. For about seven years, during which she clung to me with pathetic trust, I tried everything, ocular and systemic, to give her relief, but succeeded only for a little while or but partially. At last it entered my head that although she saw clearly at near range with her distance correction, she might need more help of a paretic accommodation, and rapid increases were made in her near lenses, until, at the age of 37, she is now wearing $+ \text{Sph. } 1.50 \text{ D.}$ as presbyopic segments in bifocal glasses, and with a satisfaction and freedom from sufferings, which she has never before experienced. Her static error is:

R.+Sph. 2.75 + Cyl. 1.50 ax. $45^{\circ} = 20/60$

L.+Sph. 0.37 + Cyl. 1.25 ax. $180^{\circ} = 20/30$

The amblyopia has improved somewhat, but a high exophoria has wholly disappeared, and there is now almost perfect muscle-balance.

CASE 1958 is that of a woman now 38, whom I had failed to give perfect relief for several years. Her static error was:

R.+Sph. 3.25 + Cyl. 0.50 ax. $75^{\circ} = 20/20$

L.+Sph. 2.50 + Cyl. 0.37 ax. $105^{\circ} = 20/20$

After a time complaints and experiments led me to order bifocal spectacles:

R.+Sph. 3.37 + Cyl. 0.50 ax. 75° } Distance
 L.+Sph. 2.62 + Cyl. 0.37 ax. 105° }
 R.+Sph. 4.00 and Cyl. } Near
 L.+Sph. 3.25 and Cyl. }

The small degree of premature presbyopia or accommodation failure could not be discovered by any tests, and only the experiment brought the fact to light.

CASE 3417 is that of a young woman of 20 years of age, in 1894, who gave me at that time a history of severe sick-headaches, the crises recurring every two weeks for the last 12 years. There was a leukomatous cornea in the right eye from keratitis as a child. I found her static refraction:

R.+Cyl. 3.00 ax. $180^{\circ} = 20/100 +$

L.+Sph. 0.62 + Cyl. 0.50 ax. $90^{\circ} = 20/20 ?$
 with 14° of exophoria.

I ordered the best correction I could give, and did not see her again until 1901, when I again refracted her eyes and gave her somewhat different lenses. The sick-headaches had been, in part, replaced during these years by a severe pain in the left side of the chest, extending to the left arm, brought on by reading, writing or sewing, even for a few minutes. This compelled her to give up her position as a school teacher. In 1903 I again retested her eyes. She reported that during the last two years, reading any length of time would cause pain under the left shoulder-blade, extending to the breast, to the base of the brain and down the left arm to the middle fingers. Thinking the struggle of the maimed right eye to retain its share in binocular vision might be the cause of her eyestrain reflexes, I asked her to try the use of a blinder over the right eye when reading. She reported in six weeks that she could not do this. There was no relief from the device. The sick-headaches, however, had been better of late and more rare, although they still clung to her, as they had done more or less during the years since I first saw her. She is now entirely relieved of the peculiar, indescribable and unendurable suffering which used to accompany the attacks, and the pain in her arm and side is not so intense, and she can use the arm more in sewing. In 1904 I had learned my lesson as to subnormal accommodation, and was not thrown off my guard so easily by the leukoma of the cornea of the right eye. I now found her refraction error to be:

R.+Sph. 0.62 + Cyl. 3.00 ax. $180^{\circ} = 20/50 ?$

L.+Sph. 1.12 + Cyl. 0.25 ax. $180^{\circ} = 20/20$

But there was exophoria of 15° , and hyperphoria of 15° , showing, of course, the complete loss of binocular fusion. Then

came to light the reason of my failure to give her complete relief during all these years, and the reason for the partial functional exclusion of the right eye, by means of the enormous heterophoria. (But the doubling of visual acuity proved the benefit of the glass.) This was a failure of accommodation power measured, in the right, by + Sph. 1.62, and in the left by 1.00. The difference in the loss is highly suggestive. Bifocal glasses were ordered and the last report was gratifying.

CASE 3812 is that of a woman who, when she came to me in 1895, was 35 years of age; her static error was:

R. + Sph. 1.62 + Cyl. 0.37 ax. 45° = 20/20

L. + Sph. 1.50 + Cyl. 0.25 ax. 45° = 20/20

For nine months she was relieved entirely of her headaches and other reflex symptoms, but with their recurrence, I found little or no change to account for them. I gave a stronger correction for near-work, but in two months there was still trouble. The symptoms were surely due to eyestrain, and I had failed to give her relief. There was but one recourse. She could temporarily overcome the weakness and see to read plainly, or at least she contended that she could do so. By experiments, I found that there was an accommodational weakness, measured by + Sph. 2.75 over her distance correction. With this, in bifocals, all the symptoms disappeared in a day, and have never returned. The woman had been a great sufferer all her life—was, in fact, an invalid under the care of many physicians and oculists. She now has good health.

CASE 4144.—For several years prior to 1902, I had been able to give this patient, aged 40 at that time, fairly good satisfaction by her distant correction worn all the time. Complaints now became insistent. She had but one useful eye, the left, the right having become practically blind from strabismus, unsuccessful operation, and disuse. The left required + Cyl. 0.50 ax. 90° to give her perfect acuteness of vision. Her symptoms were plainly due to eyestrain, and the solution only came when I found premature presbyopia, which was neutralized by + Sph. 1.37 added to her cylinder. In 1904, at the age of 42, this loss of accommodation power is measured by + Sph. 2.25 D.

CASE 4748.—This patient is a woman, now 39 years of age, who for many years has done an enormous amount of reading and writing. I had during several years prescribed glasses for constant use, but although she was generally physically strong and healthy, they were never satisfactory. Her static defect was the same in both eyes, + Sph. 0.75 + C. 0.25 ax. 90°, with perfect vision. She had had conjunctival hemorrhages after severe study, photophobia, pain, and burning in the eyes, asthenopia, and headache. After a term of abuse of the eyes, she had an attack of hemiplegia, the right side of the body being without power or sensation. The right pupil was contracted to a pin-point, the left widely dilated and responding but little to light. Rest in bed and cessation of all reading were followed by a return to normal, the hemiplegia disappearing entirely. This was seven years ago, and there has been no return of such symptoms. Two years later there was an attack of herpetic conjunctivitis, photophobia, and pain in the temples. The axes of astigmatism were now found to be 70° and 110°. Now began attacks of typic migraine, followed by intense dermatitis. These I did not at first dream were connected with eyestrain,

because, like the rest of the profession, I had never known or had forgotten what the science of 100 years ago had clearly recognized. The old clinicians, of course, had no idea that migraine was due to eyestrain, but they saw that "herpetisms" were not seldom the sequels of migraine. Wager's was a clear case of eyestrain, and he had repeated attacks of a "cutaneous malady," and "continuous attacks of erysipelas," which tormented him much of his life. My patient had most distressing attacks of "hives," and various other eruptions, pronounced by the best dermatologists atypic, and which were puzzling to them, and intractable. These attacks were sometimes called acute urticaria, psoriasis, generalized eczema, pityriasis rosacea, etc. In looking back over her life, this very intelligent patient now remembers that the eruptions were always connected with extreme use of the eyes, headache, and especially sick-headache. All of these symptoms in her case have since been repeatedly demonstrated to be due to eyestrain. They recur with leaving off the glasses, and are relieved at once by proper correction of the eye defect. A most carefully observed and excellently reported case of a similar nature has been called to my attention. It was in the practice of Dr. Charles A. Oliver, and published in *The Philadelphia Medical Journal*. The repeated demonstrations that the urticaria was absolutely caused by eyestrain is most convincing. Observations would doubtless prove the sequel more frequent than is supposed. Other cases which I had seen of these skin affections connected with migraine, and the growing conviction that migraine itself is entirely a product of eyestrain, finally landed me in the puzzle that here was a patient of 38 with an almost inconsiderable error of refraction, and yet with the most glaring diseases due to eyestrain. The solution of the mystery came with the thought of premature presbyopia, and the enormous amount of reading and writing done by the woman. A moderate amount of near-work left her free from attacks; with 10 or 15 hours a day of application there was the sick-headache and the terrible eruptions all over the body, which confined her to bed or the bath tub for a week or two at a time. There was not the least sign of recession of the near-point, and reading produced no trouble if not exceeding several hours a day. At first I gave her reading glasses + Sph. 0.62 stronger than her distant correction. These gave complete relief except when they were forgotten for two days, followed by a typical attack of migraine, and urticaria, subsiding in 24 hours after the reading glasses were resumed. With a still stronger correction (1.25), and put in bifocals, and worn all the time, this woman, now 39 years old, has had no attacks unless the glasses are broken or forgotten.

CASE 5489 is that of a woman of 23 with a static error as follows:

$$\begin{aligned} R. + \text{Sph. } 2.50 + \text{Cyl. } 1.00 \text{ ax. } 90^\circ &= 20/20 \\ L. + \text{Sph. } 3.50 + \text{Cyl. } 0.75 \text{ ax. } 90^\circ &= 20/20 \end{aligned}$$

She had suffered much from frontal headache, asthenopia, and indigestion. There was at first a high accommodation power and a low correction was followed by some relief, but a speedy return of headache, sleepiness, etc., and also by a dental reflex symptom somewhat more frequent than is suspected. Intense neuralgia came on in the jaw and teeth of one side. The teeth were demonstrated sound and healthy. One tooth finally became the seat of the toothache. This tooth was killed. The

pain at once transferred itself to the corresponding tooth on the opposite side. The nerve was likewise killed in this tooth by the obliging dentist. Another tooth seemed to die spontaneously. There was now another visit to my office, and I found the accommodation reduced to normal, but with my former low correction there was, of course, much eyestrain with continuous near-work. Full correction for reading, writing and sewing brought considerable but not complete relief, and at the last visit one diopter added to the distance glasses, for near-work has brought entire satisfaction. She is now 29; if there is a return of the symptoms I shall advise bifocals.

CASE 6316 is that of a woman of 35, whose static error is:

$$R.-Sph. 2.50 - Cyl. 0.50 \text{ ax. } 50^{\circ} = 20/20$$

$$L.-Cyl. 0.25 \text{ ax. } 140^{\circ} = 20/20$$

with an exophoria of about 20° .

She had passed through the hands of able oculists, but they had failed to notice that in such a defect the right eye would be used only for near-work, and the left only for distance, and that this would necessarily destroy the accommodation of both eyes. Their glasses, ordered only for distance or constant use, would naturally increase the patient's difficulties and symptoms instead of relieve them. By prescribing:

$$\text{Distance} \begin{cases} R.-Sph. 2.50 - Cyl. 0.50 \text{ ax. } 50^{\circ} \\ L.-Cyl. 0.25 \text{ ax. } 140^{\circ} \end{cases}$$

$$\text{Reading} \begin{cases} R.-Cyl. 0.50 \text{ ax. } 50^{\circ} \\ L.+Sph. 2.00 - Cyl. 0.25 \text{ ax. } 140^{\circ} \end{cases}$$

this patient's problem was solved, and binocular vision established.

CASE 6324 is that of a woman of 39, complaining four years ago of frontal and occipital headache, sleepiness on use of the eyes for near-work. At that time I was not aware of the fact that subnormal accommodation might be the explanation of my failure to relieve symptoms by the use of the ametropic correction alone. Here was a woman with a low degree regular compound hyperopic astigmatism (B. E.+Sph. 0.62 + Cyl. 0.50 ax. 90°), and who got little relief from evident eyestrain by the glasses ordered. For a year I tried all methods, general examination, urinalyses, with indicated hygienic and systemic therapeutics—all in vain. The woman was doing a great deal of writing and reading, and was finally compelled to give up her position, and take another with less pay and work. She returned to me recently, after an absence of two years and a half. She had a severe headache, or neuralgia, a few weeks ago, above the eyes, and was absent several days, the pain so intense that morphin was given. She has long recognized that her symptoms are caused by the use of the eyes. I had now learned my lesson, and at this visit I recognized that the symptoms indicated premature presbyopia. Her static refraction I found to be:

$$R.+Sph. 1.00 + Cyl. 0.62 \text{ ax. } 90^{\circ} = 20/40 ?$$

$$L.+Sph. 0.87 + Cyl. 0.62 \text{ ax. } 90^{\circ} = 20/20$$

When the mydriatic wore off, I found the subnormality of accommodation I had expected, and ordered:

$$\begin{array}{l}
 \text{R.} + \text{S. } 0.75 + \text{Cyl. } 0.62 \text{ ax. } 90^\circ \\
 \text{L.} + \text{S. } 0.62 + \text{Cyl. } 0.62 \text{ ax. } 90^\circ \\
 \text{R.} + \text{S. } 2.25 \text{ and Cyl.} \\
 \text{L.} + \text{S. } 2.12 \text{ and Cyl.}
 \end{array}
 \left. \begin{array}{l} \\ \\ \text{Distance} \\ \text{Reading} \end{array} \right\} \text{Bifocals}$$

There has not been sufficient time since to give the results of this correction, but I have little doubt that they will be good. The amblyopia in the right eye had not bettered in four years, a natural consequence of the noncorrection of the accommodation weakness. I am curious to see if it will not now improve somewhat, despite her age.

CASE 7005.—This patient, a woman of 32, had had temporary and partial relief of her headaches and sick-headaches for 11 years by the glasses of other oculists. Recently the appetite had grown bad. She had quite a high degree of compound hyperopic astigmatism with perfect acuity of vision. For 18 months I also was able to give her considerable comfort, but in November, 1904, there was much nausea, ill-health, and "nervousness." I again changed her glasses, finding a decided increase of astigmatism in one eye. I ordered:

$$\begin{array}{l}
 \text{R.} + \text{Sph. } 1.25 + \text{Cyl. } 1.62 \text{ ax. } 90^\circ \\
 \text{L.} + \text{Sph. } 1.37 + \text{Cyl. } 0.50 \text{ ax. } 90^\circ
 \end{array}$$

There was again a temporary and noticeable bettering, but in reading, writing, etc., the symptoms tended to recur. I ordered for near-work:

$$\begin{array}{l}
 \text{R.} + \text{Sph. } 1.87 \text{ and Cyl.} \\
 \text{L.} + \text{Sph. } 2.00 \text{ and Cyl.}
 \end{array}$$

and success was attained.

CASE 7127 is that of a man of 42, with a static correction of:

$$\begin{array}{l}
 \text{R.} + \text{Sph. } 0.87 + \text{Cyl. } 0.37 \text{ ax. } 90^\circ = 20/30 \\
 \text{L.} + \text{Sph. } 1.00 + \text{Cyl. } 0.87 \text{ ax. } 180^\circ = 20/30 \\
 \text{and without muscular imbalance.}
 \end{array}$$

I gave him weak presbyopic segments in bifocals, but he was soon dissatisfied with them, and I was puzzled to understand why, until I found he was depressing his head and reading at a great and abnormal distance through the upper or distance lenses. At the same time I discovered that my presbyopic correction was entirely too weak to allow him to read at the proper distance and for but a little while. I increased this correction first to 1.25 D., and soon was forced to carry it to 2.00 D. added to his distance lenses. During his early life the reversed astigmatism without correction could not be overcome, and the accommodation was thus highly parietic from disuse, and the odd compensation plan became habitual of reading and writing almost at arm's length.

CASE 7353 is that of a busy physician, aged 27. All the glasses that had been ordered for him before he came to me gave at best only temporary and partial relief. Thirty minutes' reading would bring on a headache and if persisted in there would be sick-headache, indescribable suffering, and depression. He was sick in bed, three years ago, for a week with "congestion of the retina." His static error was found to be:

$$\begin{array}{l}
 \text{R.} + \text{Sph. } 1.00 + \text{Cyl. } 1.00 \text{ ax. } 80^\circ = 20/20 \\
 \text{L.} + \text{Sph. } 3.50 + \text{Cyl. } 0.62 \text{ ax. } 115^\circ = 20/20
 \end{array}$$

His adduction power was only equal to the abduction; I gave him 64° of adduction power by prism gymnastics, with some relief, and added reading ability, but neither this nor my correction of his refraction error gave him ability to study or read long, and the muscle imbalance was highly variable. He persistently tilts his head to the right, but has no spinal curvature. I at last discovered subnormal accommodation, and gave him glasses for near-use, stronger by 1.00 D. than his static correction. He discovered that his symptoms were lessened, and without any decrease of distant visual acuteness, by wearing these all the time. This led me to strengthen his reading correction, the total being as follows:

$$\begin{array}{l} \text{R.} + \text{Sph. } 2.50 + \text{Cyl. } 1.12 \text{ ax. } 80^\circ \\ \text{L.} + \text{Sph. } 5.25 + \text{Cyl. } 0.37 \text{ ax. } 105^\circ \end{array}$$

But there still remained the inability to read as he desired without bringing on suffering, and the demands of his life are that he shall keep posted in medical literature and progress. At last I learned that during childhood a table fell and struck him on the forehead, cutting the scalp open the entire width of the forehead, and also vertically into the hair on one side. One cannot know what results may have been caused by such an extensive injury. Two things lead one to suspect that there was cerebral or meningeal traumatism and inflammation: He has always been somnambulistic, walking all about the house, talking, and doing strange things in his sleep; he also has a persistent subnormal temperature, ranging from 96° to nearly normal, but never over 98.4°, generally about 97°. His case is as much a puzzle to neurologists as it is to me, and I am not at all sure how far his eyes have been the cause of his troubles, or if his subnormal accommodation is the consequence of the traumatism. It is certain that his anisometropia and intense eyestrain during youth and college days would work havoc with any nervous system, but that does not imply that the head injury has not been at least a contributing cause of the man's misfortune.

CASE 7530 is that of a woman of 38, wearing atrocious optician's glasses, with much epiphoria, some frontal and temporal headache, constipation, "nervousness," or restlessness, irritability, excitability, depression of spirits, and dizziness. Her static error is:

$$\begin{array}{l} \text{Both Eyes} + \text{Sph. } 6.50 + \text{C. } 0.50 \text{ ax. } 90^\circ = 20/60 \\ \text{and some exophoria.} \end{array}$$

This huge error, of course, was not to be overcome; there had been renunciation of the attempt, with almost complete resultant lack of accommodation power. She consequently required full correction for distance, and 2.50 D. added for near in bifocals, with perfect relief of all her symptoms and a great improvement, in six months, of visual acuteness.

CASE 7554 is that of a man of 27, who has worn incorrect glasses since the age of 13. He works for 12 hours a day by artificial light at reading and writing. His eyes tire, and he has a feeling as if they were turning toward the nose, and "as if being pulled back in his head." There is temporal headache and pain in the eyes. He does not feel rested after the night's sleep. He has nausea when feeling the worst. He is very depressed and "nervous." He was wearing:

R. + Sph. 1.75 — Cyl. 3.50 ax. 15°
 L. + Sph. 1.75 — Cyl. 3.50 ax. 165°

His static refraction is:

R. + Sph. 1.25 — Cyl. 5.00 ax. 5° = 20/20?
 L. + Sph. 2.00 — Cyl. 4.75 ax. 160° = 20/40

Although only 27, I found that his correction for distance did not give him clear near vision, and I ordered + Sph. 1.75 as presbyopic segments in bifocal glasses. But this did not give relief, and two months later I increased the power of the segments to 2.25 D., when there was a disappearance of the symptoms mentioned. He returned in six weeks with slight complaints, when I discovered plain evidences of an increase of accommodation power, and I at once gave him comfort by a reduction of the segments to 1.25 D. In two weeks more, his accommodation power had become normal, and the distance glasses (remaining all the time as originally ordered), are now worn with satisfaction for all purposes.

It seems from this history that the accommodation paresis was probably due to a direct inhibition reflex.

CASE 7575 is that of a woman of 50 whose left eye has been practically blind from childhood. The static refraction of the right is + Sph. 1.75 + Cyl. 0.50 ax. 30°. She was wearing a cylinder axis 90°. She had been a great sufferer from sick-headache, car-sickness, etc., up to four years ago when glasses gave her relief. Her chief complaints now are pain in the temple, extending over the head, "congestive stomach trouble," eructations, and constipation. I found almost total paralysis of the accommodation, and ordered:

R. + Sph. 1.75 + Cyl. 0.50 ax. 30°	} Distance
L. Plano	
R. + Sph. 4.12 and Cyl.	} Reading
L. Plano.	

She has now none of the symptoms complained of, is healthy, and most grateful.

CASE 7703 is that of a woman of 29 who has suffered much from headache, the pain being throbbing and extending to the neck, and made worse by sewing. She frowns or scowls, is always sleepy, has chronic constipation, is "nervous," irritable, depressed, worries much, etc. There is complaint of lachrimation and photophobia. I ordered:

R. + Sph. 0.25 + Cyl. 0.50 ax. 90°
 L. + Cyl. 0.50 ax. 90°

In six months all symptoms were better, and her improved health was shown in a gain in weight of 15 pounds, her former weight having been 115, and now 130. But her eyes tire with near-work and in one hour get "bloodshot." These symptoms were relieved by a second pair of glasses for near-work as follows:

R. + Sph. 1.62 and Cyl.
 L. + Sph. 1.37 and Cyl.

CASE 7716 is that of a professor in a large university, who three years ago was compelled to resign because of ill-health; since then he has been wandering over the world from one physician to another in the hope of finding relief from "nerv-

ous depression," headache, intense photophobia from artificial light (not from daylight), and an awful feeling as if the head would burst. He had a nervous breakdown ten years ago after studying hard. Great neurologists and oculists have not been able to do him any good, or to understand his case. In 1901 the right pupil suddenly dilated with a reported paralysis of the accommodation of this eye. Pilocarpin ordered by a famous European oculist brought the pupil down to normal, but resulted in no permanent good. I found the right pupil wider than normal, but not reacting to stimulus either of light or accommodation. His static error is:

$$\begin{aligned} \text{R.} + \text{Sph. } 2.75 + \text{Cyl. } 2.25 \text{ ax. } 45^\circ &= 20/20 ? \\ \text{L.} + \text{Sph. } 3.75 + \text{Cyl. } 2.25 \text{ ax. } 135^\circ &= 20/50 + \end{aligned}$$

The man is 34 years of age, but I found he demanded full correction for distance, and a somewhat stronger correction for near work, which was ordered in bifocals. At the time of his first visit he was sailing for Europe the same day, and I could not keep him under observation and for continuous testing. There was some relief following the use of these glasses, an ability to read from one to two hours daily, and sometimes for quite a number of hours; but this would not be satisfying. Upon his return from Europe I found an anomalous condition of the muscular imbalance. The tests did not show any constancy of innervation, the cover tests and rod tests contradicting each other. There was sometimes an exophoria of enormous degree. There was plainly no binocular fusion. I now discovered a great weakness of the accommodation for continuous use, although by the momentary tests and those for a half-hour's reading, it was not at all detectible. And this was the secret of the man's tragedy. Moreover, there was a difference in the accommodative weakness of the two eyes, the right eye showing a greater loss of power than the left. In addition to his distance correction, I ordered in bifocals for near work:

$$\begin{aligned} \text{R.} + \text{Sph. } 4.75 \text{ and Cyl. as above} \\ \text{L.} + \text{Sph. } 5.50 \text{ and Cyl. as above} \end{aligned}$$

That is, 2.25 were added to the right, and 1.75 to the left. In a day or two he was reading much more, and without symptoms, visual acuity had greatly improved, and at all distances under six feet there was no motion of the eyes under cover. I judge that the entire history of the man's misfortunes was caused by unrecognized accommodation weakness. The history is to be completed.

CASE 7724.—A healthy actor, now 50 years of age, who has acted almost every night for some 30 years, has during the past two years been much troubled with objective vertigo, the first attack preceded by nausea. Many great physicians and specialists have pronounced him free from all organic disease, except possibly insidious brain disease. He was engaged in severe literary labor two years ago, in addition to his eyestrain from the footlights. He sometimes read all night. He has always been strong and possessed good health, never has used stimulants, not even tea or coffee, and has never had any infectious disease. Whenever he does much reading the vertigo returns. No physician has ever suggested ocular cause of his vertigo. Great oculists told him he needed no glasses, and gave him an eye lotion. He was wearing optician's glasses, of course, and

incorrect ones, it goes without saying. His static refraction was :

$$\begin{aligned} R. &+ \text{Cyl. } 0.25 \text{ ax. } 45^\circ = 20/20 + \\ L. &+ \text{Sph. } 0.25 + \text{Cyl. } 0.37, \text{ ax. } 60^\circ = 20/20 + \end{aligned}$$

When the effects of the mydriatic passed off I found that he had no accommodation power whatsoever. There was the complete paralysis of a man of 65 or 70 years of age. Bifocal glasses have given him perfect relief of his symptoms, but there remains a sensitiveness to long periods of reading, and a tendency to pain in the back of the head. A few hours of reading at a time is all he can do; by resting, walking, etc., and doing his reading by daylight, he is very happy. He cannot work by artificial light. In other patients who are actors or actresses I have also found this inability to endure artificial light, and the influence of the footlights to paralyze the accommodation. It is the secret of the ill-health of many actors and actresses.

CASE 7847 is that of a single woman of 37 years of age in 1904. She has been a great sufferer from headache, starting in the forehead, extending to the vertex, occiput, and the pain thence going down the spine. She has occasional "bilious headaches" with vomiting, and violent pain in the epigastrium. These attacks last for four days in which no food is taken or retained. The vision was extremely poor preceding the last attack. She has been greatly troubled by flatulence. She has worried much about her eyes, and keeps up a constant fight against despondency. She has terrible nightmare dreams which awaken her with fright, so that she does not sleep well at night; and yet she is drowsy and dull during much of the day. She has worn glasses, incorrect ones, for 16 years. She was for many years an engraver on gold, using a magnifying glass for this purpose, and she can now read only by the aid of this glass. Deafness began coming on while working at gold engraving, between the ages of 17 and 21, and without glasses. It became much worse about 12 years ago from an adhesive or sclerotic inflammation of the middle-ears. The static refractive error was :

$$\begin{aligned} R. &+ \text{Sph. } 2.00 \text{ D. } + \text{Cyl. } 0.37 \text{ ax. } 45^\circ = 20/30 \\ L. &+ \text{Sph. } 2.25 + \text{Cyl. } 0.37 \text{ ax. } 135^\circ = 20/30 ? \end{aligned}$$

Although this patient was only 37 years of age the correction gave her no ability to read at 14 inches, and the history of the use of the magnifying glass in engraving, and the need of it now to read with, at once suggested paralysis of the accommodation. Bifocal spectacles were ordered with the addition of + Sph. 2.25 as a presbyopic segment. In three weeks she returned to report her hearing better than for years. She now heard church bells she had not heard for many years, and there was less tinnitus. She feels buoyant, younger, and was profuse in her gratitude. At her last visit she stated that she reads and writes with ease and comfort. She had long been unable to work, but with the relief from her glasses she at once secured a position as dressmaker, and despite this kind of work she has no headache, does not use a magnifying or hand glass to read, sleeps better, etc. The old hopelessness and despondency have disappeared, and the improvement in hearing is permanent.

CASE 7851 is that of a woman of 35, whose chief complaints are of "nervous dyspepsia," "general weakness of the nerves," depression, apprehensiveness, irritability, etc. She "has always

to be on the go." She has "much gas and discomfort after eating." For the last year and a half she has had "a gurgling of gas and a pressure below the heart," whenever she reads or sews too long. Her physician has been treating her for this, and "his medicine cures it if she stops reading and writing and sewing." She has never had much headache, but has often a throbbing in the temples. She feels a nervous shock in the pelvis as acutely as in the head. Some misplacement of the uterus has been corrected. She has worn glasses for eight years prescribed by good oculists, but has had no relief from them, and the last ones ordered made her symptoms worse. This will be understood by the record:

$$\begin{aligned} \text{R.} + \text{Sph. } 1.00 + \text{Cyl. } 0.50 \text{ ax. } 75^\circ \\ \text{L.} + \text{Sph. } 1.00 + \text{Cyl. } 0.62 \text{ ax. } 105^\circ \end{aligned}$$

Her static correction I found to be:

$$\begin{aligned} \text{R.} + \text{Sph. } 2.75 + \text{Cyl. } 0.50 \text{ ax. } 75^\circ = 20/25 \\ \text{L.} + \text{Sph. } 2.75 + \text{Cyl. } 0.62 \text{ ax. } 130^\circ = 20/25 \\ \text{with } 6^\circ \text{ of hyperphoria.} \end{aligned}$$

Plus spheric 2.25 and cylinders were ordered with a partial correction of her hyperphoria. With these she found so much relief that she at once began to disobey orders and sewed immoderately, "on black," and in six weeks she returned with a recurrence of her old symptoms, especially the digestive reflexes, which she herself traces directly to use of her eyes. I was now prepared to find that I had blundered six weeks before, which I found was true. I had failed to think of a deficient accommodative power. The clearest hints were an increase of the hyperphoria, showing the inability to preserve binocular fusion and the "breaking down" under a great strain of "sewing on black." By adding plus 1.25 spherical to her distance glasses in bifocals her problem was at once solved.

CASE 7892 is that of a woman 30 years old, who has been under treatment by general physicians for a long time for gastric symptoms, dyspepsia, etc. She has had pain and nausea after eating, with flatulence and constipation. She is intensely "nervous," cannot go out alone, "trembles" a good deal, is depressed, excitable, and "a worrier." She has had all her life daytime drowsiness and frontal headache nearly every day, culminating in sick-headaches with "awful nausea" and "rush of blood to the head." I found her static error:

$$\begin{aligned} \text{R.} + \text{Sph. } 0.62 + \text{Cyl. } 0.62 \text{ ax. } 100^\circ = 20/20 \\ \text{L.} + \text{Sph. } 0.62 + \text{Cyl. } 0.62 \text{ ax. } 90^\circ = 20/20 \\ \text{with slight exophoria.} \end{aligned}$$

There was good accommodation for distance and I could only order the cylindric correction; I also gave her +Sph. 0.25 and cylinders for reading. These glasses gave her much relief and there was a betterment in all ways, although reading seven weeks later still produced considerable trouble. Then +Sph. 1.00 and cylinders was now ordered for near-work.

CASE 7951 was that of a strong, healthy, fine specimen of young womanhood of 21. Ever since the age of 10 she has had occipital headache, and especially following any reading and study since the age of 15. She has been compelled to forego all near-work, as a half hour of such strain at once causes the pain.

When she gets very tired from any cause, the headache is likely to come on. At about the age of ten it was noticed by her mother that one shoulder was higher than the other, and the spine somewhat curved. She was put under the charge of a physical culture teacher, and after several years of training the spine became straight. For several months before menophania, at about the age of 14 she had severe sick-headaches with vomiting. There have been none of these attacks for several years. She is sleepy during the day. The consciousness of her headache persists more or less clearly during her sleep at night. About five years ago she had "nervous exhaustion" and was in bed most of the time for a long period. She has worn glasses most of the time during the last five years, but for reading only. I found her wearing, both eyes + Cyl. 0.50 ax. 90°, prescribed by an oculist—a correction which was adding to eyestrain instead of neutralizing it. Her static refraction is:

$$\begin{aligned} \text{R.} + \text{Sph. } 0.25 + \text{Cyl. } 0.25 \text{ ax. } 70^\circ &= 20/20 \\ \text{L.} + \text{Cyl. } 0.25 \text{ ax. } 110^\circ &= 20/20 \end{aligned}$$

She has an exophoria of 1°, but an abduction power of 7°, and an adduction of 24°.

The patient had been sent to me from a long distance, and after many failures of other oculists and physicians to cure her headaches. I was therefore greatly worried to find an error of refraction almost impossible alone to cause the severe symptoms, which were most plainly chargeable to eyestrain. In such cases every possible proving of the tests must be gone over and the mistake or the mystery exposed. Retesting only reproved the correctness of the diagnosis, and I was forced to order:

$$\begin{aligned} \text{R.} + \text{Cyl. } 0.25 \text{ ax. } 70^\circ \\ \text{L.} - \text{Sph. } 0.12 + \text{Cyl. } 0.25 \text{ ax. } 110^\circ \end{aligned}$$

This was done in the faint hope that, as sometimes happens, an irritated and hypersensitive system might be morbidly acted upon by as slight an ametropia as this. Possibly, one knows, a higher degree and an unsymmetric one may have previously existed, and the habit-reflex persist with the slight eyestrain. True to my rule, I hung to the mystery and would not let the patient return home. When the mydriasis should have passed off I noticed that the pupils were still abnormally wide, although the accommodation had returned so that the finest type could be read at near range. This suggestion put me on the track of a solution, as I had several times found that subnormal power of accommodation for persistent use was indicated by physiologically wide pupils. The girl had always had these remarkably wide pupils. All became clear when I found that, although she could see to read even fine print for a little while, and for all ordinary testing, yet she took with great delight from 1.50 to 2.00 diopters plus spheric, and had "never seen printing look like that before." I ordered reading glasses + Sph. 1.50 D. added to her distant correction. If I find the accommodational paresis uniform and continuous, I shall ask this patient of 21 to wear bifocal spectacles, at least for house use. Whereas, before she read for only 15 or 30 minutes without headache, the report of her physician is as follows: "Not a headache since she began using the glasses. You have not only given her new eyes, but new life. She now says she has never seen like other people, or really ever enjoyed life. Her family are deeply grateful and jubilant over it."

CASE 7953 is that of a woman of 34, who has long been afflicted with temporal and occipital headache, culminating in nausea, but not vomiting. The attacks are frequent, and especially so when doing reading or sewing. "When her eyes are bad she has more nausea." She has worn glasses for ten years, generally with some temporary relief of headache with each change in glasses. The last change, made during the last summer, gave no relief. There are daytime drowsiness, chills with the nausea, a nervous shaking or tremulousness. She is despondent, irritable, easily excited. She was wearing:

$$\begin{array}{l} \text{R.} + \text{Sph. } 1.50 + \text{Cyl. } 1.00 \text{ ax. } 80^\circ \\ \text{L.} + \text{Sph. } 1.25 + \text{Cyl. } 1.50 \text{ ax. } 90^\circ \end{array}$$

By comparing this with her static error, and especially with that I ordered, given below, it will be understood why she got no relief from these glasses. Her mydriatic error I found to be:

$$\begin{array}{l} \text{R.} + \text{Sph. } 1.37 + \text{Cyl. } 1.62 \text{ ax. } 85^\circ = 20/20 \\ \text{L.} + \text{Sph. } 1.00 + \text{Cyl. } 2.25 \text{ ax. } 105^\circ = 20/20 \end{array}$$

While testing her I noticed that she persistently tilted her head about 10° to the left, and when I found that with the average of her axes of astigmatism there still remained 10° of asymmetry in the left eye which could be rectified only by tilting the head toward the left side, I said to her: "Oh, you are left-handed?" She was surprised that I should have inferred the fact. She was forced to learn to write during childhood with the right hand, is a "very poor writer now," but does all other usually dextromanual acts with her left hand. When she told me that seven years ago her pastor had jokingly spoken to her as the member of his congregation who always looked up at him with her head to one side, I said to her: "You have curvature of the spine." She had never suspected it. Examination of the naked back showed the right shoulder much lower and longer than the other, an upper dorsal curvature of the spine, the convexity to the left, with a compensating curve to the right in the lower dorsal and lumbar regions. The muscular developments and anomalies of the back were those common in such cases. At the postmydriatic examination of the eyes I found that she took a high correction for distance, and this, with other suggestions, led me to suspect subnormal accommodation. I found that $+ \text{Sph. } 1.25$ was needed to give her clear and satisfying vision at 14 inches, and an ability to carry on near-work without the migraine with which she had so long been tormented. There has been relief of all other symptoms complained of.

CASE 7959 is that of a physician of 39, who has consulted the most famous oculists of half a dozen cities, but up to last year, has been unable to use the glasses ordered with any relief of his symptoms. The last prescribed gave him comfort, except for reading and writing. Even as a small boy he was pronounced "neurasthenic," and had frontal headaches almost constantly and could study but little. He has always been troubled with insomnia, and of late years he cannot read without intense sleepiness. He is "nervous," depressed, easily worried. Both external recti muscles have been scissored without any relief. His most bitter complaint is of confusion or obfuscation whenever he reads, and is usually unable to understand what he is reading without the most intense effort, and

by rereading it several times. He was wearing glasses that corrected his error of refraction with fair accuracy. His static error I found to be:

R. + Sph. 0.75 + Cyl. 0.37 ax. 90° = 20/20
 L. + Sph. 0.75 + Cyl. 0.25 ax. 90° = 20/20
 with perfect muscular balance.

In such a case there was but one solution: If he had good adduction and accommodation power, eyestrain could not be the cause of his symptoms. And yet his symptoms were beyond all question due to eyestrain. For 20 or more years his professional work had been handicapped, and he had spent much of his life consulting oculists and trying experiments, for he never doubted that it was his eyes which were at fault. I found paresis of the accommodation measured by +Sph. 1.25 D., and ordered bifocals. He at once was able to read and write at pleasure, and with unbounded pleasure, and without a symptom of discomfort or confusion. The first day he wore his spectacles he read two and a half hours, and the second day one and a half hours on a train—a thing he had never before been able to do. Even in a few minutes, previously, reading or writing brought on the symptoms, which increased with every minute of continuance.

CASE 7961 is that of a physician and professor, aged 32, who was wearing, both eyes, +Sph. 1.00, prescribed by an oculist in Germany, after a nonmydriatic examination. His chief symptoms have been aching of the eyes, sleepiness on reading, restlessness, "bloodshot" eyes, blepharitis after reading, and lacrimation. He is completely left-handed, the attempt to force him to write with his right hand in childhood and youth having been a failure, although his left hand was tied behind him. It is fortunate for the man that the foolish attempt was not successful. I ordered for him:

R. + Sph. 0.75 + Cyl. 0.25 ax. 125° } For distance
 L. + Sph. 0.75 + Cyl. 0.25 ax. 105° }
 R. + Sph. 1.37 and Cyl. } For near work
 L. + Sph. 1.37 and Cyl. }

This patient's troubles were henceforth ended.

CASE 7964, one of peculiar interest, is that of a young man of 21 who has always had a weak and ailing left eye. He has long been in the habit of convulsively closing and winking it, especially during reading. Great sleepiness is his chief complaint, whenever he is not in the open air. He has been troubled with "biliousness" and constipation. He is always "nervous," and had a "nervous breakdown" in July and August, 1904. He is easily worried and excited, much depressed, and imagines that he has all the diseases described by others. He never feels rested by going to bed or sleep. After his "breakdown," long rest from work and seeming recovery last year, his old symptoms returned when he went back to his office work as clerk. I found his static refraction to be:

R. + Sph. 0.37 + Cyl. 0.62 ax. 90° = 20/20 +
 L. + Cyl. 2.75 ax 90° = 20/200

There was no disease of the media or fundus of the left and his amblyopia was therefore from disuse. But something told

me not to be satisfied with this diagnosis of the error of the left eye and I persisted, long in vain, until I found the following:

L. + Sph. 0.50 + Cyl. 2.75 ax. 90° —Cyl. 1.12 ax. $60^{\circ}=20/60$

I am unable to explain the origin of this irregular astigmatism. But I was still unsatisfied, and after a time I was able to demonstrate a remarkable subnormality of accommodation differing in degree in the two eyes. His presbyopic correction ordered was:

R. + Sph. 1.50 with cylinders
L. + Sph. 2.50 with the two cylinders.

In 24 hours the visual acuity of the left eye had risen to 20/50, with an immediate disappearance of all symptoms, and a satisfaction in distant and near vision of the most gratifying kind.

These data suggest that:

1. Subnormal, paretic, or insufficient accommodation, or premature presbyopia, even paralysis of the accommodation, of a functional or reflex nature, not dependent upon organic disease, exists in a certain, probably much larger than suspected, proportion of young or middle-aged persons.

2. The youngest of my patients was 20, the oldest 50. Several cases show that the subnormal accommodation existed during adolescence. That 18 were women and 9 men has only the significance that women are more subject to eyestrain than men because they do more near-work with the eyes, are less resistant, etc.

3. It is usually permanent or ingravescent, although there was complete recovery in one of my cases.

4. It may be caused by such degrees and kinds of ametropia as compel the renunciation of the accommodative function, especially high hyperopia or astigmatism, etc.; monocularity; glare of footlights; the use of magnifying glasses in engraving, etc.; long-continued abuse of the eyes; a direct inhibiting reflex to the accommodational mechanism. It will be noticed that 17 of my patients had unsymmetric astigmatism, and most of the others an ametropia or anisometropia unconquerable by the visual mechanism. In many cases there may be no discoverable or pathologic cause, the determining factor being a personal and physiologic peculiarity. We are prone to forget that presbyopia really begins with the beginning of life, as the recession of the near-point commences in infancy, and is continuous throughout life up to the age of 60 or more. In the normal progress, and when uncomplicated by ametropia, this recession, at about 45, reaches a degree which makes reading weary-

ing at 14 inches with ordinary-sized type, because the book and writing cannot be held further away; because the letters are so small, and because the macular image is too minute. If our arms were five feet long and our printers used type about a third inch in height, all might get on without presbyopic glasses. The crystalline lens of the eye loses its inherited and high elasticity with each year of life. As it has no neurologic connection with the brain, and is not nourished by red blood-corpuscles, this loss of elasticity is most natural. It is consequently as natural and inevitable that its inherited and primary elasticity should differ in different individuals and that local ocular and also systemic disease and denutrition, eyestrain, etc., should still further make the ingravescent inelasticity of varying degrees of progress. The resultant symptoms will depend upon the amount and morbidity of the near-work demanded of the accommodation. The number of those under 45 with subnormal accommodation is thus probably much higher than supposed and this fact gives us the suggestion to be constantly upon our guard as to its presence.

5. It is of all degrees and varieties, and may even differ in amount in the two eyes.

6. It may complicate the condition of head tilting, torticollis, etc., with secondary spinal curvature, due to a peculiar axis of astigmatism in the dominant eye. The pathogenic results of dextrocularity and sinistrocularity should not be forgotten.

7. The pathognomonic symptoms are the persistence of common eyestrain reflexes (such as migraine, headache, indigestion, intestinal fermentation, constipation, nervous disorders, dermatoses, etc.) after proper correction of the ametropia and muscle imbalance, and especially an inability to carry on continuous near-work.

8. The diagnosis is impossible by any of the ordinary tests. The loss of power has come on so slowly or has been so long present that the patients have no suspicion that the print is not clear, and it is usually possible for them to read even the finest letters with ease, and for a short time. The comparative rarity of the cases also throws the oculist off his guard, and routine begets carelessness. Abnormally wide pupils of one or both eyes, the demand of high corrections for distant vision, certain occupations, certain forms of ametropia and anisometropia, high heterophoria, unrelieved reflexes, photophobia, etc., are suggestions that there may be accommodation weakness.

9. It is an active cause of heterophoria, adding to the proof of the common dependence of muscle imbalance upon ametropic and optical causes. It is therefore an added demonstration, if it were needed, of the mistake of the tenotomists who operate for heterophoria. In the vast majority of cases, heterophoria is ametropic in origin, innervational in nature, and is an effort of nature to lessen eyestrain. The results of operation are therefore evil, and make the cure more difficult by physiologic methods.

10. The treatment is by means of bifocal spectacles which accurately neutralize the error of refraction for distant, and the deficiency in accommodational power for near vision. As in all treatment whatsoever, success here also depends upon the amount of irreparable damage done before the appropriate therapeutic measure is found. Usually relief is sudden and striking. Whatever of usefulness there is in the nonsensical "fogging system" is explained by the fact of incorrect refraction and subnormal or paretic accommodation.

American Medicine

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sional journalism.

THE DISCOVERY OF SUBNORMAL ACCOMMODATION IN THE YOUNG.

To the Editor of American Medicine:—It has now become a common observation that "there is nothing new under the sun." Old discoveries are being constantly rediscovered, often several times, and with no knowledge of the existence of the previous ones. This is largely due to the insufferable amount of medical literature whereby it becomes impossible for late students, especially if busy practitioners, to "read up" and to find the references to previous work. Much of our literature has misleading titles, much is not properly indexed in catalogs and epitomes, and worse than all is the neglect of literary research work on the part of the authors of textbooks. It is astonishing to find how far behind even these most authoritative textbooks are in the matter of summarizing the literature and discoveries of previous workers. Important matters are wholly neglected, the echoings of older books repeated as if by rote, and in many respects the book is a generation old before it is issued from the press as an epitome of the latest science. And all this despite the existence of yearbooks and periodical summaries of progress of a score of kinds and publishing firms. Thus the individual discoverer, in almost unavoidable ignorance of what has already been done, goes on working out anew the old problems and rediscovering old truths. But there are some compensations, of course, for this unfortunate tendency. Each rediscoverer approaches the subject from a somewhat new, or at least individual point of view, and there is thus a peculiar emphasis and light thrown upon the problem. There is also the satisfaction of a confirmation of the truth in value far outweighing all the personal aspects, the claims for "priority," etc. Those whose minds are fervently interested in the scientific or therapeutic truths are glad of the confirmation by previous delvers, and happy to give credit to earlier students.

There is still another aspect which may not be forgotten: All early discoveries are usually in the beginning partial, and have been led up to by hints, suggestions, incidental phasings of yet earlier workers, so that a too exclusive or decided claim of priority on the part of one may not be valid. Not only, for instance, should Wallace also be honored for the discovery of the principles now called Darwinian, but Lamarck's dues are daily gaining recognition, and many others had previously

suggested and dimly recognized or stated the fundamental verities of the evolution or developmental processes of nature.

And lastly should be noted the truth that the method of presentation, the confirmatory evidence, the proper placing, the significance as regards practise and future correlations and extensions may warrant the giving to a later discoverer as much honor as to an earlier one. One illustration of all this has lately come to my knowledge: In 1869 was published an article by Dr. H. Kaiser, in the *Archives of Ophthalmology*, on "Binocular Vision," in which incidentally he advanced the theory of dextrocularity, offering some excellent proofs of it, and giving the name of "the prevailing eye," to what later I called "the dominant eye." In *Ophthalmology*, for January, 1905, there is an abstract of an article by Majewsky, published in 1903, in which Kaiser's theory is independently restated, and his argument and illustrations essentially repeated. Neither Majewsky, his abstractor, or the editor of *Ophthalmology* were evidently aware of Kaiser's work of 34 or more years ago. I have published several articles on the subject in 1904, also ignorant of the studies of Kaiser and of Majewsky. Kaiser's article could only be indexed and cataloged under a title which would not suggest the thought of dextrocularity, and Majewsky's work was published in an obscure Polish periodical.

A second illustration occurs in reference to my article published in *American Medicine*, January 21, 1905, concerning "Subnormal Accommodation and Premature Presbyopia." So far as I can learn the credit of the first clear statement of the principle is due to Dr. Samuel Theobald, of Baltimore, Md., published in the *Transactions of the American Ophthalmological Society*, in 1891. But in the *Ophthalmic Record* of April, 1899, Dr. J. G. Huizinga, of Grand Rapids, Mich., under the title, "Necessity for Knowing the Range of Accommodation," not aware of Dr. Theobald's study, published an article which shows from a somewhat different point of view the essential truth of Dr. Theobald's contention. So far as I can judge, the road-opening labor of Dr. Theobald and the excellent paper of Dr. Huizinga have had little or no practical results in the actual clinical work of most oculists. When I think of the numerous patients under my own care in the past whom my ignorance of this relief-bringing measure has not cured of their grievous sufferings, I am heartily ashamed of myself.

Respectfully,

Philadelphia, January 28, 1905.

GEORGE M. GOULD.